



The city of Tarragona upgraded to a smart drinking water network

Drinking Water Networks

s::can technology is used to monitor drinking water in real-time in the distribution network of Tarragona, Spain. Stations monitor up to 8 parameters (UV254, turbidity, color, TOC, DOC, free Cl, conductivity, pH & T) together with event detection software based on UV-Vis spectral alarms which are sent to EMATSA.



Empresa Municipal Mixta d'Aigües de Tarragona (EMATSA)

Parameters monitored:

- TOC / DOC
- UV254
- nitrates
- turbidity
- colour
- free chlorine
- conductivity
- pH
- temperature

Facts & Figures

Company:
Ematsa

Location:
Tarragona, Spain

Application:
Drinking Water

s::can Subsidiary:
s::can Iberia

Key Products installed:
micro::station, spectro::lyser, chlori::lyser, ana::tool

Background

A few years ago large water utilities started to consider benefits for operating smart drinking water networks. Real-time monitoring of the distribution network allows water utilities to make sure that water quality is kept from the source all the way to the tap. In addition, it helps to make sure the water which is purchased from other companies complies with the expected quality. It also can identify water sources in case there is more than one, identify different origins (surface water, ground water, brackish water), know the percentage of water from each source and even make sure any intentional or unintentional contamination is detected.

In Spain s::can's online monitoring micro::stations are installed at the water tanks of EMATSA. EMATSA manages the entire water cycle in the city of Tarragona with a population of around 150.000 people. Water supplied is both surface and ground water (80:20).

Installation

micro::stations were equipped with free chlorine, conductivity and pH sensors together with a UV-Vis spectrometer. The UV-Vis sensor has 35mm optical window length and is cleaned with a rotating brush. All sensors are connected to a con::cube terminal, a high-performance, power efficient industrial computer, with very flexible options for interfacing to SCADA or any central database.

Stations were provided with an IP address and 3G network in order to allow users to connect in remotely.

Results and discussion

For some parameters such as UV254, TOC, DOC, pH and turbidity, online values were stable. For others, like free chlorine, nitrates, conductivity and temperature, some fluctuations were monitored. Nitrate peaks were monitored when the water source was switched from surface water to ground water from wells.



Conclusions

micro::stations show very good correlation to laboratory values. They are able to detect sudden changes due to changes in operation, especially for nitrates when the water source was modified. When intentional contaminations from manual dosing were applied in a closed loop, the event

detection software ana::tool successfully detected pattern alarms and spectral alarms. The monitoring station, micro::station, integrates a third party online equipment through modbus TCP for microbial monitoring and to run in-house s::can software on it.

“After successfully passing the preliminary tests, validating therefore this equipment as well as the integration of other sensors, EMATSA S.A., Tarragona Water Company, has decided to implement, this control system in order to increase the water quality at our customers' homes.”

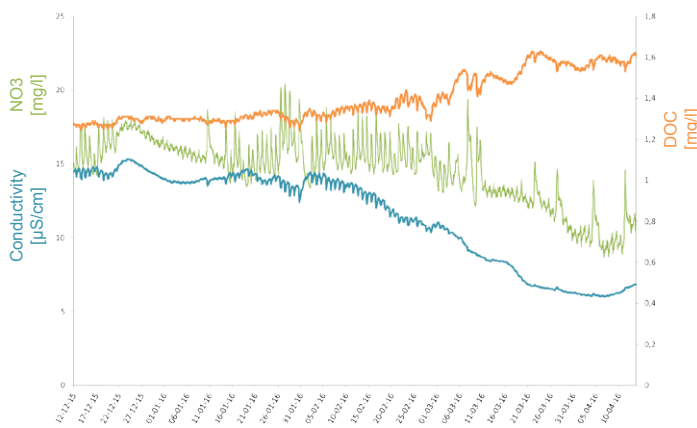
Daniel Milan, EMATSA General Manager

Process Schematic

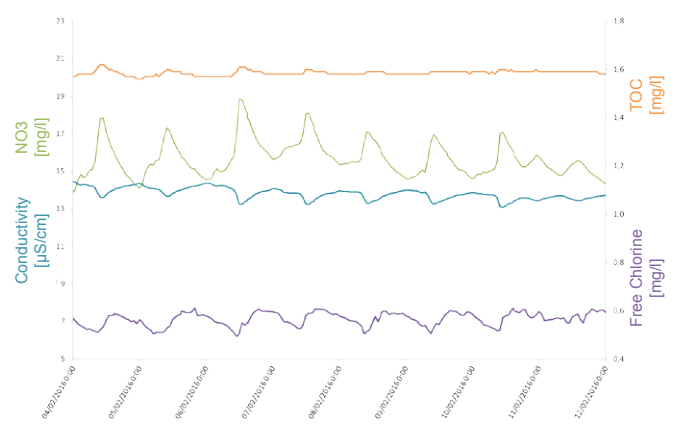


Locations of the five micro-stations

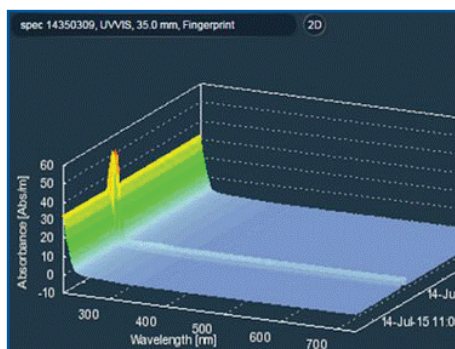
Four-month maintenance-free monitoring



Effect of groundwater pumping in the distribution network



The s::can spectro::lyser™ is a fully submersible UV-Vis spectrometer that measures light absorbance between 190 – 750 nm. s::can's proprietary algorithms analyze and decompose the spectral data to provide measurements for many water quality parameters. There are no moving parts in contact with the water and no reagents are used, resulting in almost zero operating costs.



The moni::tool software is a revolutionary platform for the management of measuring stations.

The image above shows a 3D spectral fingerprint in moni::tool. The clearly visible peak was caused by spiking the online pipe system in a closed loop with nitrates.



Empresa Municipal Mixta d'Aigües de Tarragona S.A. (EMATSA) is a company of the Town Hall of Tarragona and Sorea, Agbar Group. EMATSA manages the entire water cycle in the city of Tarragona with a population of around 150.000 people. Its drinking water distribution network is 425 km long.

More information:
<https://www.ematsa.cat>